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Heart Failure

THE EFFECTS OF AGING, SEX AND AEROBIC FITNESS ON MYOCARDIAL LIPID CONTENT

Poster Contributions
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Session Title: Insights into Diagnosis and Treatment of Heart Failure with Preserved Ejection Fraction
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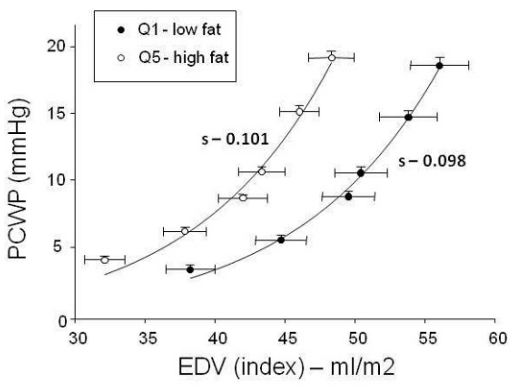
Background: Aging and sedentary lifestyles lead to cardiac atrophy, stiffening and impaired diastolic function. Both conditions are marked by increased body fat which can lead to fat deposition in non-adipocyte tissue. The effect of excess intra-myocardial fat on cardiac function in non-obese individuals is unknown.

Methods: Cardiac lipid content was measured in 153 healthy non-obese subjects with varying fitness levels using magnetic resonance spectroscopy. Cardiac function was assessed using echo and invasive measurement (right heart catheterization) of left ventricular (LV) filling pressure under varying preloads. LV stiffness was assessed by the slope of LV pressure-volume curve.

Results: Cardiac lipid content correlated with female sex and low peak oxygen uptake (VO2peak). Subjects with highest lipid content had smaller LV end diastolic volumes and a decreased peak early mitral annular velocity. There were no differences in LV stiffness but a leftward shift in the PV curve suggesting a less distensible LV in subjects with higher cardiac lipid levels (Figure). After adjusting for age, VO2peak and sex, morphometric and functional differences amongst groups were no longer significant.

Conclusions: Female sex and peak fitness levels are the strongest predictors of myocardial lipid content in non-obese humans. Cardiac lipid content exerts only a minimal effect on LV function in healthy non-obese individuals, and more likely reflects changes related to underlying fitness and age.

End-diastolic pressure volume relationship in lowest and highest quintiles of cardiac lipid content



End-diastolic portion of pressure-volume (PV) curve in subjects with lowest cardiac lipid content (Q1) and highest (Q5). End diastolic volumes (EDV) were obtained from 3-dimensional echocardiography and indexed to BSA. Stiffness constants (s) were derived from an exponential curve fit as described in the methods. While stiffness constants for subjects in the highest and lowest quintiles were similar, a leftward shift in the end-diastolic PV relationship suggests a less distensible left ventricle. PCWP – pulmonary capillary wedge pressure. Values are mean ± SE.